 ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Allocation of Spectrum Below 5GHz Transferred from Federal Government Use	)	ET Docket No. 94-32

COMMENTS
OF
AMERICAN MOBILE SATELLITE CORPORATION

American Mobile Satellite Corporation ("AMSC") hereby submits its comments on the Commission's Notice of Inquiry in the above-referenced proceeding.[1/] The Notice seeks comments on the utility to potential applicants of 50 MHz of spectrum that the Federal Government is transferring immediately to private sector use. AMSC's analysis of the bands indicates that the newly-transferred spectrum has at most very limited utility for Mobile Satellite Service ("MSS").[2/] Nonetheless, due to the severe shortage of spectrum available for MSS, AMSC is continuing to

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1/ FCC 94-97 (May 4, 1994). AMSC is the parent corporation of AMSC Subsidiary Corporation, the FCC licensee of the U.S. Mobile Satellite Service system, which is preparing for the launch of its first satellite in the next few months and the comments of full service operations in 1995. AMSC is also the parent corporation of Personal Communications Satellite Corporation, which has applied to construct an MSS system in the 2 GHz bands. AMSC's owners include such communications industry leaders as GM Hughes Electronics Corporation; McCaw Cellular Communications, Inc.; Mobile Telecommunications Technologies Corporation; and Singapore Telecommunications Ltd.

2/ Attached hereto is a copy of the comments that AMSC filed with the National Telecommunications and Information Administration on May 11, 1994, discussing the utility for MSS of all the bands proposed for transfer from the Federal Government.

analyze the possible utility of the 2390-2400 MHz and 2402-2417 MHz bands for MSS downlinks and hopes to present that analysis to the Commission as part of its July 15, 1994 comments on the preparations for the 1995 World Radiocommuications Conference. IC Docket No. 94-31. The bands clearly are of no utility as an MSS uplink, due to the high levels of interference that MSS space stations would receive from ISM devices and Part 15 equipment.

Respectfully submitted,

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Dated: June 15, 1994

RECEIPT COPY

Before the
NATIONAL TELECOMMUNICATIONS AND
INFORMATION ADMINISTRATION
Washington, D.C.

Rec'd 11 May 1994

Preliminary Spectrum)
Reallocation Report)

COMMENTS
OF
AMERICAN MOBILE SATELLITE CORPORATION

American Mobile Satellite Corporation ("AMSC") hereby comments on the Preliminary Spectrum Reallocation Report (the "Report") prepared by the National Telecommunications and Information Administration ("NTIA").[1/] AMSC applauds the NTIA effort to find suitable frequencies to reallocate from government to private use. The Mobile Satellite Service ("MSS") is experiencing a dramatic shortage of spectrum below 3 GHz due to the tremendous demand for such spectrum by an increasing number of MSS systems worldwide; the reallocation of government spectrum provides one of the very few ways to constructively address this shortage.

As discussed below and in the attached Technical Appendix, the frequencies proposed in the Report are not useful for MSS

1/ AMSC is the parent corporation of AMSC Subsidiary Corporation, the FCC licensee for the U.S. MSS system, which is preparing for the launch of its first satellite in the next few months and the commencement of full service operations in 1995. AMSC is also the parent corporation of Personal Communications Satellite Corporation, which has applied to construct an MSS system in the 2 GHz bands. AMSC's owners include communications industry leaders such as GM Hughes Electronics Corporation, McCaw Cellular Communications, Inc., Mobile Telecommunications Technologies Corporation and Singapore Telecommunications Ltd.

systems. AMSC therefore proposes two alternative government bands that its analysis indicates can be shared by MSS systems and incumbent government users: (i) the 1492-1525 MHz for MSS downlinks, which can operate without causing interference to aeronautical telemetry operations, and (ii) 1675-1710 MHz bands for MSS uplinks, which can share with meteorological operations. These bands were allocated to MSS at the 1992 World Administrative Radio Conference ("WARC-92") and, if allocated domestically, will help ensure the continued growth of the new service.

Background

With the tremendous growth of such ground-based mobile services as cellular telephones has come a corresponding boom in usage, interest and investment in satellite-based mobile communications. Inmarsat is operating its first and second generation satellites, constructing a third generation system, and planning a fourth generation system. The first dedicated U.S. MSS system is poised for launch and scheduled to begin operations in 1995. At least, nine U.S. companies have filed applications with the FCC to construct mobile satellite systems that will operate in bands below 3 GHz.[2/] Internationally, more

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[2/] See, e.g., Applications of Personal Communications Satellite Corporation (April 7, 1994); Celsat, Inc. (April 8, 1994); Constellation Communications, Inc., File Nos. 17-DSS-P-91, CSS-91-013 (June 3, 1991); Ellipsat Corporation, File Nos. 11-DSS-P-9 (November 5, 1990) and 18-DSS-P-91(18) (June 3, 1991); Loral Qualcomm Satellite Services, Inc., File Nos. 19-DSS-P-91, CSS-91-014 (June 3, 1991); Motorola Satellite Communications, Inc., File Nos. 9-DSS-P-91(87), CSS-91-010 (continued...)

than 35 U.S. and foreign MSS systems have been Advanced Published with the International Telecommunication Union solely in the frequencies in which AMSC has been authorized to operate.

With sufficient spectrum, these and future MSS systems will bring much needed communications services to rural and remote areas of the world not served by terrestrial communications systems. For example, the AMSC system will provide thousands of channels of high quality, two-way mobile voice communications over an area covering millions of square miles of land, air and water. The AMSC system will provide a nationwide communications system for public safety, law enforcement and interstate transportation, allowing access to either the Public Switched Telephone Network or private telecommunication facilities. The AMSC system will complement terrestrial cellular systems, through the use of a dual-mode phone that can be used on both MSS and cellular frequencies, providing nationwide coverage for cellular subscribers.

The growing demand for MSS and the increasing number of MSS systems worldwide has put considerable strain on the limited allocations that have been made to the new service. At WARC-92, largely as a result of U.S. efforts, significant amounts of additional spectrum were allocated to MSS in the 1-3 GHz

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[2/] (...continued)
(December 3, 1990); TRW, Inc., File Nos. 20-DSS-P-91(12), CSS-91-015 (June 3, 1991); Orbital Communications Corporation, File No. 20-DSS-MP-90(20) (February 28, 1990).

range.[3/] These include primary, Region 2 allocations in the bands 1492-1525 MHz and 1675-1710 MHz.

Since WARC-92, the FCC has allocated the 1530-1544/1626.5-1645.5 MHz and 1610-1626.5/2483.5-2500 MHz bands to MSS.[4/] Though helpful, these bands will have to be shared among numerous mobile satellite systems operating in the U.S. and abroad and with incumbent terrestrial services, and thus will not have enough useable spectrum to meet the demand for all the new systems that have been proposed.

Under Title VI of the Omnibus Budget Reconciliation Act of 1993, the Secretary of Commerce is required to provide from the spectrum allocated for Federal Government users an aggregate of at least 200 megahertz below 5 GHz (including 100 megahertz below 3 GHz) for allocation by the FCC to non-Federal users. This action was intended to promote the development of new technologies.[5/]

[3/] Though significant, the new allocations fell far short of the 355 megahertz identified by U.S. industry groups as likely to be required to meet demand for the new service. See Comments of AMSC, Gen. Docket No. 89-554, at 6 and Table 2 (December 3, 1990). Moreover, use of the new bands is conditioned upon the completion of sharing studies by Working Parties and Study Groups of the ITU Radiocommunication Sector. As a result, World Radiocommunication Conferences in 1995 and 1997 are expected to address the use of the new MSS frequencies and potential new allocations. See Notice of Inquiry, IC Docket No. 94-31, FCC 94-96 (May 5, 1994).

[4/] See First Report and Order and Further Notice of Proposed Rulemaking, 8 FCC Rcd 4246 (1993); Report and Order, 9 FCC Rcd 536 (1994).

[5/] In determining which bands have the greatest potential for productive uses and public benefits, the Act directs the Secretary of Commerce to consider the extent to which

(continued...)

In the Report, NTIA identifies ten bands for reallocation. Three of the bands (2390-2400 MHz, 2402-2417 MHz and 4660-4685 MHz) are scheduled to become available immediately, and are the subject of an FCC Notice of Inquiry on how the spectrum should be allocated for commercial use.[6/] Half the bandwidth (1670-1675 MHz, 1710-1755 MHz and 3650-3700 MHz) would be shared between government and non-government users, and more than half would not be available until either 1999 (1390-1400 MHz, 1427-1432 MHz, 1670-1675 MHz and 3650-3700 MHz) or 2004 (1710-1755 MHz).

Discussion

The bands proposed for reallocation by NTIA will not help alleviate the MSS spectrum dilemma. As discussed in the attached Technical Appendix, the bands present the following problems: (i) they are not allocated internationally to MSS and would thus expose U.S. MSS systems operating in the bands to interference from foreign systems; (ii) they are adjacent to existing frequencies used by services that would interfere with MSS systems in the proposed bands; or (iii) they cannot be shared with the existing Government users.

[5/] (...continued)
equipment will be available to work in the band; the proximity to other bands assigned for commercial use; and the activities of foreign governments in making frequencies available for experimentation or commercial assignments in order to support their domestic manufacturers of equipment.

[6/] See Notice of Inquiry, ET Docket No. 94-32, FCC 94-97 (May 4, 1994).

In contrast, the 1492-1525 MHz and 1675-1710 MHz bands are ideal candidates for new MSS allocations.[7/] These bands were allocated to MSS at WARC-92 on a primary basis for Region 2. The U.S. opposed the international allocation at the time, but that opposition was based on the premise that MSS could not share the bands with the incumbent U.S. systems, a premise that may no longer be valid as shown in AMSC's analyses.

1492-1525 MHz

The 1492-1525 MHz band is part of a larger band (1435-1525 MHz) primarily used for air-ground flight test telemetry operations. The Report concludes that the cost and operational impact of a reallocation would outweigh any public benefit. However, as demonstrated in the attached Technical Appendix, the 1492-1525 MHz band can be made available immediately on a mixed (government/non-government) basis between aeronautical telemetry systems and MSS systems. Implementation of an MSS allocation would be based on case-by-case coordination between the MSS operators and incumbents.

1675-1710 MHz

The 1675-1710 MHz band is principally used by meteorological satellites and radiosondes (weather balloons). The Report concludes that reallocation of these bands could have a detrimental impact on the delivery of weather-related services

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7/ Besides these bands, AMSC proposes that NTIA continue to work with the MSS industry to identify additional bands that may be suitable for MSS and that may be allocated at WRC-95.

and loss of the $1 billion invested by the government in these weather predicting systems. As discussed in the Technical Appendix, however, there are significant possibilities for MSS sharing with the meteorological services; the band, therefore, could be made available immediately on a mixed use basis.

Conclusion

The NTIA Preliminary Spectrum Report is a great stride forward for new spectrum allocations. AMSC recommends that NTIA revisit the possibility of the reallocation of the 1492-1525 MHz and 1675-1710 MHz bands on a shared government/non-government basis to be made available immediately for domestic MSS. AMSC also recommends that NTIA consider making available other bands as well.

Respectfully submitted,

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TECHNICAL APPENDIX

INTRODUCTION

In its Preliminary Spectrum Reallocation Report ("NTIA Report"), the Federal Government identifies a total of 200 MHz from among ten frequency bands in the 1 - 5 GHz frequency range that may be made available to non-Federal users for accommodation of emerging technologies and major new telecommunications industries. However, none of these bands are suitable for the Mobile-Satellite Service ("MSS"), which is prominent among the services requiring new accommodations. As explained in Section I, it would be difficult if not impossible to implement any of these bands for MSS uplinks or downlinks as a results of the protection requirements or interfering potential of U.S. and foreign systems operating in the same and adjacent bands. Our analyses indicate that the Federal Government should allow "mixed" use of the 1675-1710 MHz and 1492-1525 MHz bands, which were allocated by WARC-92 for MSS uplinks and downlinks, respectively.

I. THE BANDS PROPOSED FOR REALLOCATION WILL NOT ALLEVIATE THE SHORTAGE OF MSS SPECTRUM

As summarized in Table 1, none of the bands identified by the Federal Government for FCC reallocation is suitable for MSS. None of these bands is aligned with ITU MSS allocations. Thus, in the near term, if not permanently, MSS systems would be unprotected from foreign systems and MSS systems would be required to protect foreign systems. This generally poses unacceptable risk for commercial MSS systems that require large

investments that do not yield returns for several years.[1/]

1/ These compatibility and risk problems do not occur to the same degree for terrestrial systems, such as the terrestrial PCS systems that are the beneficiary of generous new allocations already proposed by the FCC. As suggested in this filing, the Federal Government reallocation process should accommodate emerging technologies such as MSS that require additional allocations.

Table 1 - Suitability of Proposed Reallocation Bands for MSS

Band (MHz)	Suitability for MSS Uplinks	Suitability for MSS Downlinks
1390 - 1400	RSEC (1) does not afford enough protection of satellite receiver from radar out-of-band emissions.	Precluded in Section 5 of NTIA Report - radio astronomy cannot withstand MSS PFD. (2)
1427 - 1432	Too narrow for accommodation of U.S. and foreign MSS systems, and so, ITU reallocation is not likely to be salable. Downlinks precluded in Section 5 of NTIA Report. (3)	
1670 - 1675	ITU reallocation not possible due to incompatible aeronautical mobile (ground-to-air) allocation adopted by WARC-92. MSS downlink sharing with radio astronomy below 1670 MHz would be problematic.	
1710 - 1755	Mixed use sharing with residual Federal Government systems is not practical. (4)	
2300 - 2310	High levels of interference to satellite from foreign fixed, mobile, and radiolocation systems. (4)	MSS PFD may be too high for protection of foreign systems. (4) Potential compatibility problems with space research (deep space) below 2300 MHz.
2390 - 2400	High levels of interference to satellite from ISM equipment. (5)	High levels of interference to mobile earth stations from ISM.
2402 - 2417		
3650 - 3700	ITU reallocation not feasible due to need for and use of current fixed-satellite service allocations. MSS is not compatible with current usage by Intelsat and Inmarsat.	
4635 - 4660	ITU reallocation not feasible due to need for and use of current fixed-satellite service allocations and RR Appendix 30B allotments.	
4660 - 4685		

NOTES:

(1) RSEC: Radar Spectrum Engineering Criteria, as specified in Chapter 5 of the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management. These criteria include state-of-the-art limits on unwanted emissions from radars; however, the high power of radar fundamental emissions necessarily results in high power levels in unwanted emissions.

(2) In preparations for WARC-92, AMSC evaluated the 1350-1400 MHz band and concluded that the 1350-1390 MHz portion would be suitable for MSS (Earth-to-space); however, the NTIA Report retains that portion of the band for Federal Government use. See Comments of AMSC, Gen. Docket No. 89-554, at 11-15, December 3, 1990.

(3) In preparations for WARC-92, AMSC proposed that the 1427-1435 MHz band be reallocated for government and non-government mobile aeronautical telemetry to accommodate the operations of users that may claimed would be displaced as a result of an MSS allocation below 1525 MHz. See e.g., Id, at 12. That proposal remains viable in light of the MSS and Broadcasting-Satellite allocations adopted by WARC-92 at 1452-1492 MHz and 1492-1525 MHz, respectively.

(4) See texts of ITU-R Task Group 2/2, which indicate difficulties in sharing between MSS and terrestrial services.

(5) In preparations for WARC-92, AMSC showed that interference from ISM devices would make MSS (Earth-to-space) operations near 2400 MHz impractical. See Comments of AMSC, Gen. Docket No. 89-554, Technical Appendix, at 40-44, April 12, 1991.

II. THE 1675 - 1710 MHz BAND SHOULD BE OPENED FOR DOMESTIC MSS ON A SHARED BASIS WITH METEOROLOGICAL SERVICES

Studies being conducted in Working Parties 7C and 8D of the International Telecommunication Union Radiocommunication Sector ("ITU-R") are converging on the conclusion that sharing between MSS uplinks and meteorological services in the 1675-1710 MHz band is feasible,[2/] and Task Group 8/3 will soon have to determine how much spectrum may be available to MSS in that band.[3/] AMSC's study, attached hereto as Annex I, shows that interference to MSS satellites would be at acceptable levels and that adjacent- and co-channel sharing techniques would enable full protection of meteorological services from mobile earth station transmissions. Accordingly, all of the conditions placed on MSS by Radio Regulation ("RR") No. 735A for protection of meteorological services would be met. Adjacent channel sharing precludes interference by accommodating the mobile earth station fundamental emissions outside the frequencies used by meteorological systems and by limiting the power density of mobile earth station out-of-band emissions that do fall within meteorological channels. This is feasible because current (pre-GOES-NEXT) and next-generation

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[2/] See "Frequency Sharing Between the Meteorological-Satellite Service (space-to-Earth) and the Mobile-Satellite Service (Earth-to-space) in 1675-1710 MHz Band," Doc. 7C/TEMP/27(Rev.1), dated 5 April 1993, and "Liaison Statement [of Working Party 8D] to WP 7C," Doc. 8D/TEMP/86(Rev.2), dated 4 November 1993.

[3/] See "Work Programme for Decides 2.1.2, 2.1.4, 2.2, 2.3 and 2.4 of Decision 1-1/8," Doc. 8-3/TEMP/6(Rev.1), dated 30 March 1994.

meteorological satellite systems do not occupy 8.1 MHz and 15.55 MHz of the 1690-1710 MHz range, respectively. Adjacent channel sharing will remain feasible indefinitely as a result of: the frequency agility of MSS systems such as AMSC's; the inherent need to maintain guard bands between meteorological channels; and trends in spectrum requirements for meteorological systems, including the need to reaccommodate meteorological-satellite high-data-rate channels in larger bands in future generations of spacecraft. Co-channel sharing could be implemented in additional parts of the band through time sharing at frequencies used for scheduled meteorological transmissions or by ensuring there will be adequate geographic separation between meteorological receivers and mobile earth stations at known locations.

A. Interference to GSO MSS Uplinks Would Be at Acceptable Levels

As demonstrated in Annex I (Section 2.4), the interference power received by domestic GSO MSS satellites from transmitting meteorological satellites and radiotheodolites in the 1675-1710 MHz band would be well within acceptable levels. Specifically, with the exception of one meteorological satellite transmission occupying only 26 kHz (i.e., weather facsimile ("WEFAX")), interfering signal power levels in MSS narrowband channels due to various meteorological transmissions would be at least 6 dB below -169 dBW, which is an interfering signal power level that can be readily accommodated in MSS link power budgets. The

small bandwidth used for WEFAX type broadcasts can be easily avoided in MSS frequency plans. In addition, the total power generated in an MSS satellite transponder by a worst case deployment of US and foreign meteorological satellites and radiotheodolites will not consume a significant amount of the available feeder downlink power. Insofar as the power density of the current and future meteorological transmissions addressed in this study are likely to encompass those of meteorological systems that may be operated even further in the future, it is unlikely that the 1675-1710 MHz band will ever become undesirable for MSS as a result of interference caused by meteorological systems.

B. Meteorological Services Would be Fully Protected

1. Adjacent Channel Sharing is Workable Based on Limits on Mobile Earth Station Fundamental and Unwanted Emissions

The potential interference to meteorological receivers due to the out-of-band emission power of typical mobile earth stations falling within the receiver passband, as well as receiver desensitization and spurious responses to the fundamental emissions of typical mobile earth stations is at acceptable levels, as defined in ITU-R Document 7/87. Thus, adjacent channel sharing is practical because a large amount of spectrum in the 1675-1710 MHz band is not occupied by current or next-generation meteorological systems. Specifically, Annex I (Section 3) shows that for a random deployment of mobile earth stations, the probability of

interference due to co-location and the attendant adjacent channel interference mechanisms is well below the acceptable level. The review of part-time and full time spectrum usage indicates that current (pre-GOES NEXT) and next generation meteorological U.S. systems will not use 8.1 MHz and 15.55 MHz of the 1690-1710 MHz band, respectively. The pending decrease in occupancy results from improved efficiency in meteorological satellite transmission systems and planned reaccommodation of certain high-data-rate transmissions in other bands.

2. Time Sharing of Frequencies Used for Scheduled Meteorological Transmissions is Possible Through Coordination of Time Schedules

Certain meteorological transmission are made on a scheduled, part time basis, which enables co-channel time sharing with domestic MSS systems. Scheduled transmissions occur from GSO satellites, radiosondes are flown on a scheduled basis, and meteorological satellites in low Earth orbit are visible to U.S. receivers for an average of about 9 minutes per pass totaling less than one hour per day. During these transmissions, the MSS network control system can preclude co-channel assignments.

3. Geographic Sharing is Practicable on a Co-Channel Basis at CDA and Other Frequencies for Mobile Earth Stations at Known Locations

Although the locations of only a small minority of meteorological earth stations is known, included among these are all users of certain wideband meteorological satellite transmissions such as Command and Data Acquisition ("CDA") downlinks. Protection of these operations is certain to be required at Wallops Island, Virginia, and Gilmore Creek, Alaska, and may be required at a few other sites such as Redwood City, California. In addition, receiver sites (NOAA) and areas (DOD) for meteorological aids systems are known, and protection of these systems may be needed throughout the 1675-1690 MHz band.[4/] At least two alternative techniques could be incorporated in MSS systems to ensure that the necessary frequency-distance separations are maintained between the meteorological receivers at known locations and transmitting mobile earth stations. In cases where meteorological receivers are few and far between, some MSS satellite beams may be devoid of the subject receivers and co-channel assignments could be freely made in those beams. In other cases, the locations of GPS-equipped mobile earth

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4/ The frequency of a radiosonde drifts substantially as a result of acute environmental temperature changes as it ascends. Thus, although the radiosonde signal has narrow bandwidth, it may sweep throughout the 1675-1690 MHz band. The NTIA Report (Section 4) admits that the frequency drift of radiosondes will have to be reduced to accommodate the proposed reallocation of 1670-1675 MHz, and that initiative may also eventually enable a reduction of the meteorological aids allocation in the 1675-1690 MHz band.

stations could be accurately monitored through brief position reports to the network control system, which would ascertain whether the mobile earth is or may become located within protection areas around each of the subject receiver sites. The dimensions of the protection areas and network control system details would be approved by the meteorological parties prior to implementation.

III. THE 1492 - 1525 MHz BAND SHOULD BE OPENED FOR DOMESTIC MSS AND 1525

Sharing of the 1492-1525 MHz band between MSS downlinks and Mobile Aeronautical Telemetry ("MAT") systems can be implemented under principles similar to those enabling the current sharing of the 1525-1535 MHz band. Specifically, as demonstrated below and in Annex II, attached hereto, the sharing criteria specified in the ITU-R for MAT systems can be met by limiting the number of MSS channels or their downlink Power Flux-Density ("PFD"). The criteria are met for one MSS channel with very high PFD or a few moderate-PFD channels that are proximate to the center of the most vulnerable type of MAT channel. The number of compatible MSS channels can be increased substantially by accommodating them in clusters at the edges of MAT channels, which would be possible by MAT system conformance with the standard and alternate channelizations specified for telemetry systems by the Range Commanders Council.[5/] For example, a cluster of at least 25 high-PFD channels could be accommodated at the

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[5/] "Telemetry Standards," IRIG Standard 106-93, January 1993.

boundaries of each standard (1 MHz) MAT channel, which would yield at least 825 GSO MSS channels in the subject band. This same technique would also adequately protect mobile earth station receivers from MAT transmissions. Thus, efficient sharing can be accomplished with virtually no impact on MAT operations. Still larger numbers of MSS channels could be accommodated through upgrades to MAT systems and further modifications to MAT frequency assignment practices, which could also facilitate the ensuing international coordination of MAT systems with proposed foreign MSS and Broadcasting-Satellite systems.

A. Mobile Aeronautical Telemetry Would Be Fully Protected by MSS Downlink Power Flux-Density Limits and High Satellite Elevation Angles

As demonstrated in Annex II, the frequency sharing criteria specified by MAT users can be met by domestic GSO MSS systems at every MAT receiver site.[6/] The high, constant elevation angle of GSO satellites serving the U.S. yields substantial antenna discrimination from the MAT receivers that enables sharing with MSS. Thus, the acute interference problems anticipated by MAT users for foreign MSS satellites and broadcasting satellites located low on the horizon simply will not occur with respect to U.S. domestic MSS systems.

6/ For sharing criteria, see "Coordination Thresholds and Techniques for the Protection of Mobile Aeronautical Telemetry Systems in the Band 1452-1525 MHz," Doc. 8B/TEMP/26(Rev1), dated 2 November 1993.

The analysis shows that with very high MSS PFD as well as other unfavorable assumptions, only one MSS channel could be safely accommodated on a co-channel basis near the center of each MAT channel. The number of narrowband co-channel MSS transmissions could be increased through the use of lower but still satisfactory PFD levels. Even greater numbers of MSS downlinks could be accommodated near the edges of MAT channels, without interference, by virtue of the frequency dependent rejection available from MAT receivers.

B. The Means for Protecting of MAT Systems Also Yields Protection of Receiving Mobile Earth Stations

The aircraft transmissions in MAT systems could generate high levels of interference in co-channel mobile earth stations located within line-of-sight. However, by operating the MSS downlinks near the edges of MAT channels, as suggested above, the mobile earth station receivers would provide frequency dependent rejection sufficient to limit interference to acceptable levels.

DECLARATION

I, Thomas M. Sullivan, do hereby declare as follows:

1. I have a Bachelor of Science degree in Electrical Engineering and have taken numerous post-graduate courses in Physics and Electrical Engineering.

2. I am presently employed by Computer Sciences Corporation and was formerly employed by the IIT Research Institute, DoD Electromagnetic Compatibility Analysis Center.

3. I received in 1982 an official commendation from the Department of the Army for the establishment of worldwide accommodations for mobile earth stations.

4. I am qualified to evaluate the technical information in the Comments of American Mobile Satellite Corporation. I am familiar with the Manual of Regulations and Procedures for Federal Radio Frequency Management.

5. I have first-hand experience in the coordination of frequency assignments for mobile satellite systems.

6. I have been involved in the preparation and have reviewed the Comments of American Mobile Satellite Corporation. The technical facts contained therein are accurate to the best of my knowledge and belief.

Under penalty of perjury, the foregoing is true and correct.

May 11, 1994
Date

Thomas M. Sullivan
Thomas M. Sullivan

ANNEX 1

TO

TECHNICAL APPENDIX

FREQUENCY SHARING BETWEEN METEOROLOGICAL SERVICES AND THE MOBILE-SATELLITE SERVICE IN THE 1675-1710 MHz BAND

Table of Contents

List of Illustrations